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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726.790	12/02/2003	Andrew J. Ouderkirk	59414US002	6109
32692	7590	07/28/2006	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			ROY, SIKHA	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/726,790	<b>Applicant(s)</b> OUDERKIRK ET AL.	
	<b>Examiner</b> Sikha Roy	<b>Art Unit</b> 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0106_0606</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

The Amendment, filed on May 15, 2006 has been entered and acknowledged by the Examiner.

Applicant's election of Group I (method claims 1-18) without traverse is acknowledged. Cancellation of Group II, device claims 19-39 has been entered.

The objection to Drawing is withdrawn because of amendment to specification.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 9 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,155,699 to Miller et al.

Regarding claim 1 Miller discloses (Figs. 2,3 column 5 lines 10-15,33-44,62-67) a method of making light source 26 comprising the steps of forming a first optical component comprising a phosphor material 36 in fixed relation to a first multilayer interference reflector 30 (DBR mirror including multiple layers, 32,34 in Fig. 3), providing a second optical component comprising an LED 12 capable of emitting light that excites the phosphor material and positioning the first optical component to receive light emitted from the second optical component. Miller discloses (column 3 lines 10-15) the first

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optical component including wavelength selective reflector 30 and the phosphorescent layer 36 is formed over the second optical component LED 12 and hence examiner takes the position that these first optical component and the second optical component are separate optical elements, one being positioned over the other as shown in Fig. 3.

Regarding claim 9 Miller discloses (Fig. 6 step 44, column 8 lines 1-11) the forming step comprises embedding the phosphor material 36 and the first multilayer interference reflector 30 in an optically transparent potting material (clear epoxy).

Regarding claim 13 Miller discloses (Fig. 6 step 48) the forming step comprises forming a layer of phosphor material.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,155,699 to Miller et al. and further in view of U.S. Patent 6,172,810 to Fleming et al.

Claim 2 differs from Miller in that Miller does not exemplify the multilayer interference reflector being flexible.

Fleming in analogous art of polymer multilayer reflective coatings discloses (column 5 lines 5-14) flexible polymeric multilayer reflectors. It is to be noted that flexible multilayer reflective coatings provide the advantage of applying on flexible substrates and conforming to the optical element on which it is applied.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include flexible multilayer interference reflector as suggested by Fleming for forming the first optical component of Miller for the advantage of providing on a flexible substrate and conforming to the optical component on which it is applied.

Regarding claim 3 Fleming discloses (column 2 lines 5-24) the use of polymeric multilayer reflectors which are more resistant to water, acids, bases, corrosion and other environmental degradation thus improving the life of the display.

Regarding claims 6 and 7 Fleming discloses (column 7 lines 55-64) multiple polymer layers can be disposed in optical association with optical elements using coating, lamination methods which are well known in the art.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,155,699 to Miller et al. and further in view of U.S. Patent 6,583,930 to Schrenk et al.

Regarding claim 5 Miller is silent about the first multilayer interference reflector comprising alternating layers of first and second thermoplastic polymer and wherein at least some of the layers are birefringent.

Schrenk in the same field of endeavor discloses (column 5 lines 10-16, column 6 lines 6-27) a multilayer optical interference reflector comprising alternating first and second layers of transparent thermoplastic polymers of different refractive indices, wherein some layers are birefringent. Schrenk further teaches that the birefringent layers reflects and polarizes portion of the light incident on its surface while transmitting the remainder of the light and hence the multilayer film can be constructed to polarize and reflect only a narrow wavelength range while remaining transparent to the remaining portion of the incident light.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the multilayer interference reflector comprising alternating layers of first and second transparent thermoplastic polymer with some birefringent layers as taught by Schrenk in the multilayer reflector of Miller for polarizing and reflecting a portion of the incident light while remaining transparent to the remaining portion of the incident light.

Claims 4, 8, 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,155,699 to Miller et al. and further in view of U.S. Patent 5,813,753 to Vriens et al.

Regarding claim 4 Miller discloses all the limitations except for the phosphor material comprising an adhesive material in a fixed relation to the first interference reflector.

Vriens in relevant art of LED phosphor device discloses (Figs. 2,3 column 3 lines 32-50) the phosphor material comprising phosphor grains mixed with adhesive epoxy in a fixed relation to the multilayer reflector 37. Vriens further discloses mixing phosphor grains through epoxy provides the advantage of reducing number of processing steps of forming phosphor layers.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the phosphor material mixed with adhesive as suggested by Vriens in the first optical component of Miller for reducing number of processing steps in applying phosphor material in fixed relation to the first multilayer interference reflector.

Regarding claim 8 Vriens discloses (Fig. 4 column 6 lines 36-50) a second short-wave pass filter 47 added on top of the LED in fixed relation to the phosphor material. Vriens teaches that this short wave pass filter has the advantage that visible light emitted by the phosphor material in the direction of the LED is reflected by this filter towards the viewing side and thus enhances the light intensity.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include this second multilayer interference reflector as taught by Vriens in the method of making the light-emitting device of Miller so that the visible light emitted by the phosphor material in the direction of the LED is reflected by this second interference reflector towards the viewing side and thus enhances the light intensity.

Regarding claim 14 Vriens discloses in Figs. 3,4 that the phosphor material (phosphor grains) is a discontinuous layer of phosphor material.

Regarding claim 15 it is clearly evident from Figs. 3,4 of Vriens that phosphor material is a plurality of dots of phosphor material.

Regarding claim 16 Vriens discusses (column 3 lines 35-37) the importance of the size of the phosphor grains so that maximum UV/blue light emitted from the LED is converted to visible light.

Regarding claim 16, Miller and Vriens disclose the claimed invention except for the limitation of each dot having an area of less than  $10,000 \mu\text{m}^2$ . It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to select each dot having an area of less than  $10,000 \mu\text{m}^2$  for providing maximum intensity, since discovering an optimum value of a result variable is considered within the skills of the art.

Regarding claim 17 Vriens discloses (column 3 lines 52-56) the plurality of dots comprising phosphor material emitting red, green and blue when exposed to the UV light from LED.

Claim 18 Miller and Vriens disclose all the limitations except the forming step comprising mating the first optical component and the second optical component. It would have been obvious matter of design choice since the applicants have not disclosed that this joining the two components by mating solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well



with the method of forming the light source as disclosed by Miller, the second optical component is formed and then the first optical component is formed on its top.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,155,699 to Miller et al. and U.S. Patent 6,172,810 to Fleming et al. and further in view of U.S. Patent 5,813,753 to Vriens et al.

Regarding claim 10 Miller and Fleming disclose the step of forming multilayer interference reflector comprising polymeric material but do not explicitly disclose the step of forming first multilayer short-pass or long-pass reflector.

Vriens discloses (Embodiment 3 Fig. 3 column 4 line 65 through column 5 line 16) a long-wave pass filter 37 positioned on the front side of the LED stack 31. Vriens discloses this multilayer long-wave pass reflectors reflect UV/blue light back to the phosphor and transmit visible light emitted by the phosphor and thus enhance the transmission of visible light and better UV protection.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include the step of forming first polymeric multilayer long-wave pass reflector on the phosphor layer of Miller and Fleming as taught by Vriens so that reflectors reflect UV/blue light back to the phosphor and transmit visible light emitted by the phosphor, thus enhancing the transmission of visible light.

Regarding claim 11 Vriens discloses (Embodiment 9 Fig. 4 column 6 lines 36-50) step of forming a second short-wave pass reflector 47 which transmits the UV/blue light and reflects visible light . This configuration provides the advantage of visible light

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emitted by the phosphor grains in the direction of the LED is reflected and hence overall intensity is increased.

Regarding claim 12 Miller, Fleming and Vriens disclose the first polymeric multilayer long-pass reflector and the second polymeric multilayer, a short-pass reflector.

### ***Response to Arguments***

Applicant's arguments filed May 15, 2006 have been fully considered but they are not persuasive.

In response to applicants' argument regarding claim 1, that (Remarks page 11, lines 4-13) Miller does not teach forming or providing separate first and second optical elements the Examiner respectfully disagrees. Miller does indeed disclose (column 3 lines 10-15, column 7 line 62 through column 8 line 33) forming second optical component comprising LED capable of emitting light and then providing the first optical component including phosphor and multilayer interference reflector on the second optical component. The examiner notes that the claim only recites 'method comprising the steps of' and does not recite any particular sequence and specific steps (like pre-forming) of manufacturing the individual components. Hence 'forming the first optical component before the second optical component' as claimed does not materially differentiate from the method comprising the steps of forming the second optical component and then forming the first optical component as disclosed by Miller. Furthermore Miller clearly discloses (Fig. 3 and column 8 lines 5-25) the first optical component including multilayer interference reflector and the phosphorescent material

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including multilayer interference reflector and the phosphorescent material is positioned over the second component with LED to receive light emitted from the LED.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (703) 308-7382.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Sikha Roy*

Sikha Roy  
Patent Examiner  
Art Unit 2879